PART I

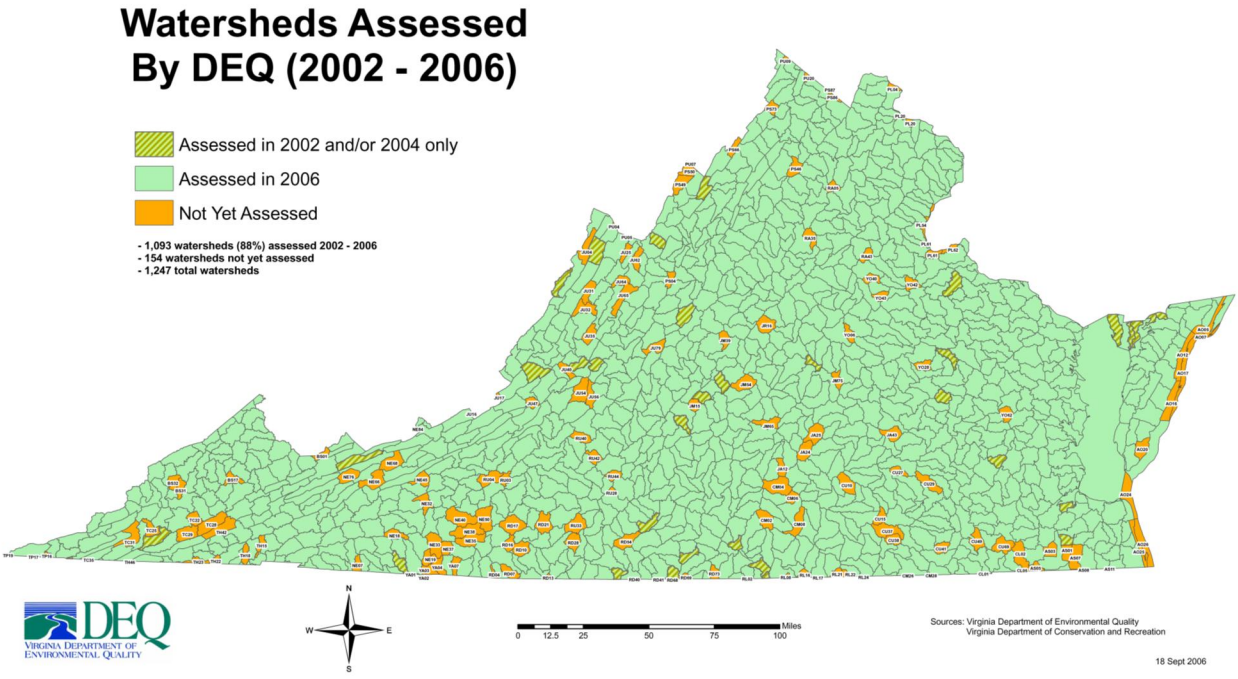
Chapter 1.1 EXECUTIVE SUMMARY

The 2006 Water Quality Assessment 305(b) and 303(d) Integrated Report (IR) describes the water quality conditions in the Commonwealth of Virginia during the time period beginning January 1, 2000 through December 31, 2004. The primary purpose of this report is to satisfy the water quality reporting requirements of the Commonwealth of Virginia under Sections 305(b), 303(d), 106, 314 and 319 of the Federal Clean Water Act and the Virginia Water Quality Monitoring, Information and Restoration Act (Section 62.1-44.19:5 C of the Code of Virginia).

Overview of Results

Impaired area in rivers and streams increased from 6,931 linear miles in the year 2004, to 9,002 miles in 2006. Impaired area in estuaries increased from 1,907 square miles in 2004, to 2,212 square miles in 2006. Impaired area for lakes increased from 89,834 acres in 2004 to 109,202 acres in 2006. There are currently a total of 1,712 TMDLs (Total Maximum Daily Loads) that will need to be developed based on these results. It is important to note that impaired waters from previous assessments that have not developed a TMDL, had a shellfish condemnation rescinded, have been confirmed as naturally impaired or re-assessed according to appropriate Standards continue to be counted as impaired and needing a TMDL in 2006 even if they were not monitored during the current reporting period. For the 2006 assessment, DEQ has begun the process of adopting the new 6th Order (12-digit) sub-watershed delineation scheme of the National Watershed Boundary Dataset (NWBD) which breaks down the former 494 watersheds into 1,247 smaller ones. At this scale, 1,093 sub-watersheds have had some monitoring in them and that data has been assessed in 2002, 2004, and/or 2006 using either water column and/or living resource data (Figure 1.1-1).

Figure 1.1-1 Map with sub-watersheds assessed since 2002

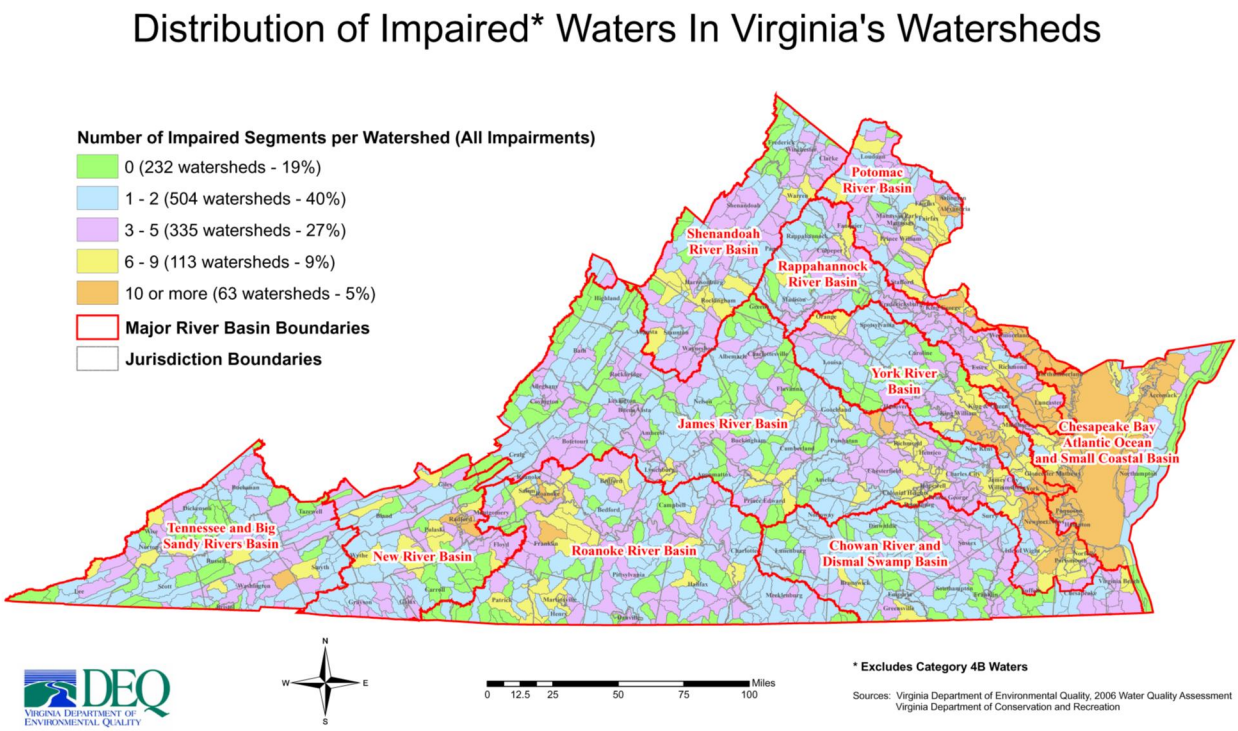


The Impaired Watershed Distribution Map (Figure 1.1-2) is a more accurate qualitative snapshot of the quality of surface waters in Virginia. Sub-watersheds that contain at least one impaired water are shown in Figure 1.1-2. Reporting more evenly-sized impaired sub-watersheds in this report will replace the reporting of impaired "segments" which varied too greatly in size to enable meaningful comparisons over a period of years.

0 impairments: 232 sub-watersheds, 19%
1 - 2 impairments: 504 sub-watersheds, 40%
3 - 5 impairments: 335 sub-watersheds, 27%
6 - 9 impairments: 113 sub-watersheds, 9%
≥10 impairments: 63 sub-watersheds, 5%

A history of impaired area by waterbody type is provided in Table 1.1-1. Additional details on each water body type are contained in Tables 1.1-2, 1.1-3, and 1.1-4.

FIGURE 1.1-2 Impaired Watersheds Distribution Map



This map can be downloaded at http://www.deq.virginia.gov/wqa

Assessment Method Used in This Report

Table 1.1-1 Impaired Area Identified Per Assessment Cycle By Waterbody Type 1996 - 2006

Waterbody Type	1996	1998	2002	2004	2006
Rivers & Streams 50,357 (Miles)	2,016	2,611	4,838	6,931	9,002
Lakes 116,058 (Acres)	17,141	0	115,558 [1]	89,834	109,202
Estuaries 2,248 (Sq. Miles)	506	437	1,689	1,907	2,212

[1] Area included lakes shared by Virginia and North Carolina. Additional 25,724 acres determined to be in North Carolina and removed from Virginia's 2004 and 2006 total impaired acreage.

DEQ initially incorporated the Integrated Reporting (IR) guidance and associated "Category" classification the U.S. Environmental Protection Agency (EPA) developed for the 2004 assessment. Like the 2004 IR, the 2006 assessment combines the 305b overall assessment of Virginia's waters with those waters assessed as impaired but not needing a TMDL (Category 4) as well as impaired and needing a TMDL (Category 5) as per Section 303(d) of the Clean Water Act . Every water or "assessment unit" (AU) has been placed in the highest category applicable (i.e. 5 > 1) to any of the designated uses for which they were assessed. Below are the US EPA defined Categories:

- Category 1: Water fully supports all designated uses.
- Category 2: Water fully supports some designated uses, but there is either insufficient or no information regarding the remaining designated uses.
- Category 3: There is insufficient information to determine if any designated uses are being met.
- Category 4: Waters are impaired or threatened but do not need a TMDL.
- Category 5: Waters are impaired and do need a TMDL.

The EPA Integrated Report guidance allows the states to subdivide the federal Categories in order to address state programmatic needs. Virginia established subcategories for most EPA categories in 2004 and due to progress with TMDL development, found it necessary to add several new subcategories in 2006. See Chapter 2.2 of this report for a description of the Virginia defined subcategories and other information on the methodologies used for the assessment.

EPA defines threatened waters as those waters that are predicted to not meet Water Quality Standards during the next 305(b) reporting cycle and therefore considered needing a TMDL. DEQ believes impairment should be confirmed by current monitoring data that are compared to Water Quality Standards criteria prior to any listing for TMDL development. However, for the 2006 IR, DEQ has conducted a trend analysis of long term data from specific trend stations in an attempt to "predict" potential impairments during the next reporting period. This report includes the first extensive update of the analysis of water quality trends in Virginia since the 305(b) Report in 2000. Results showed that over 80% of the trend stations showed no statistically significant trend in either the 1985-1994 or 1995-2005 period. A majority of the remainder showed improvements in the concentrations of bacteria, total nitrogen, total phosphorus, and total suspended solids for both periods. Additional information on trend analysis can be found in Chapter 2.4 of this report."

Additionally, Virginia has used and continues to use the "observed effects" classification found in Virginia sub-categories 2B and 3C for waters that may indicate potential water quality problems. These assessments are primarily based on evaluated and/or other related data especially those associated with nonpoint source impacts. See Chapter 2.2 for additional information on the assessment of waters with observed effects. As part of the ongoing assessment process, follow-up monitoring of these waters with observed effects, as resources allow, should provide more conclusive data for future assessments. Additional detail on impairment causes can be found in Chapter 3.1 and overviews of the assessment in each river basin are detailed in Chapter 3.2.

Results – Rivers and Streams

This report presents the results of the assessment of water quality in approximately 14,265 miles (28.3%) of the total 50,356 miles of the state's free-flowing streams and rivers for which sufficient data was available to assess at least some designated uses. The remaining stream miles were evaluated as insufficient data to determine if designated uses are being met. Related information is presented based on sub-watersheds however, since even sub-watersheds often have more than one waterbody, these numbers cannot be added together.

Table 1.1-2 presents the results of the 2006 assessment for the river and stream miles assessed.

Table 1.1-2 Assessment Results for Rivers/Streams

Degree of Use Support	Water Type	Total Miles *(Rounded to the Nearest Whole Number)*	No. of Sub-watersheds Affected
Supports Uses (EPA Categories 1 and 2)	River (mi.)	5,263	605
Insufficient Data (EPA Category 3)	River (mi.)	36,091	1,125
Impaired (EPA Categories 4 and 5)	River (mi.)	9,002	874
Total	River (mi.)	50,356	N/A

The leading cause of impairment of designated uses in Virginia's rivers and streams is violation of the bacteria Standards. In 2003 Virginia adopted three new bacteria criteria for primary recreation (swimming) use including fecal coliform, E. coli and enterococci. See 9 VAC 25-260-170 for additional information on these new criteria. Agricultural practices appear to be one of the primary sources contributing to the bacteria Standards violations. However, urban runoff, leaking sanitary sewers, failing septic tanks, domestic animals and even wildlife can be significant contributing sources.

Results – Lakes and Reservoirs

As per the 2006 assessment guidance, lakes and reservoirs that are publicly accessible, greater than 100 acres, and/or serve as a public water supply are considered significant. For 2006, Virginia assessed many of the 110 significant publicly owned lakes and reservoirs with an estimated 116,054 total acres. For the 2006 reporting period, 112,473 acres (96.9%) were monitored in Virginia and assessed with sufficient data for one or more designated uses. The remaining acres were evaluated as insufficient data to assess any designated uses.

Table 1.1-3 presents the results from the 2006 assessment of lakes and reservoirs.

Table 1.1-3 Assessment Results for Lakes/Reservoirs

Degree of Use Support	Water Type (110 monitored)	Total Acres *(Rounded to the Nearest Whole Number)*	No. of Sub-watersheds Affected
Supports Uses (EPA Categories 1 and 2)	Lakes (acres)	3,271	25
Insufficient Data (EPA Category 3)	Lakes (acres)	3,579	23
Impaired (EPA Categories 4 and 5)	Lakes (acres)	109,202	150
Total	Lakes (acres)	116,058	N/A

Many reservoirs were impaired for aquatic life use, primarily due to natural stratification causing dissolved oxygen depletion in the hypolimnon (bottom waters). Also, exceedences of the fish tissue standard for PCB (Polychlorinated Biphenyls) were a major cause of fish consumption use impairment in lakes and reservoirs.

Results – Tidal Estuaries

New Chesapeake Bay Water Quality Standards adopted in 2005 for 30-day mean dissolved oxygen (DO) and Submerged Aquatic Vegetation (SAV) are assessed in the 2006 report. 30-day DO exceedences, predominantly during the summer months, and a shortage of SAV acres in most tidal areas were found and are further explained in Chapter 6.7. Additional Chesapeake Bay Standards (e.g. chlorophyll *a,* migratory spawning and short term DO criteria) should be assessed in the 2008 report.

Another important adjustment to the 2006 assessment is the modification of the methodologies to assess estuarine benthic conditions and the assessment of sediment toxicity data relative to estuarine water quality criteria. EPA Region 3, Virginia, and the state of Maryland continued to work together to refine the method used in 2004 to assess the random benthic index of biological indicators (B-IBI) collected by the Chesapeake Bay Program. The partners mentioned above agreed that the refined methodology improved on the previous methodology used in 2004 because it provides a better comparison of benthic sample results to "reference conditions" that are used to determine where benthic impairments are located.

Table 1.1-4 presents the assessment category results from the 2006 assessment of tidal estuaries and includes B-IBI and Chesapeake Bay Standards results. Sufficient data was available for assessment of at least one or more designated uses in 2,382 square miles (98.2%) of the total 2,425 square miles of estuarine waters. The remaining square miles were assessed as insufficient data to determine if any designated uses were being met.

Table 1.1-4 Assessment Results for Estuarine Waters

Degree of Use Support	Water Type	Total Square Miles *(Rounded to the Nearest Whole Number)*	No. of Sub-watersheds Affected
Supports Designated Uses (EPA Categories 1 and 2)	Estuary (sq. mi.)	170	25
Insufficient Data (EPA Category 3)	Estuary (sq. mi.)	44	23
Impaired (EPA Categories 4 and 5)	Estuary (sq. mi.)	2,212	191
Total	Estuary (sq. mi.)	2,425	N/A

The leading cause of impairment in Virginia's estuarine waters is violation of the new Standard for Submerged Aquatic Vegetation, which is associated with aquatic life use. Dissolved oxygen violations during the summer months are also widespread in estuarine waters (Chapter 6.7). Another major cause of impairment is violations of the fecal coliform bacteria Standard associated with shellfish consumption advisories.

Based on limited available information, all of Virginia's 120 miles of the Atlantic Ocean Coastal Waters were evaluated as fully supporting Virginia's designated uses.

Fish Consumption Advisories

As of December 31, 2005 there were 52 fish consumption advisories in Virginia, 39 for PCBs, 12 for Mercury, and one for Kepone. This is an increase from 17 advisories in the 2004 report. The increase in advisories for PCBs was mainly due to the Virginia Department of Health revising in 2004 their guidelines for issuing fish consumption advisories by lowering the acceptable concentration of PCBs in fish tissue from 600 parts per billion to 50 parts per billion. The additional fish consumption advisories due to mercury is attributable to DEQ increasing fish monitoring in certain waterbodies that have environmental conditions which have recently been recognized as being associated with increased potential for bioaccumulation of mercury in fish. These environmental conditions include low pH, low dissolved oxygen and high organic matter. Many of these waterbodies are swamp waters and have little or no industrial or municipal dischargers, thus they had not been sampled before. The Virginia Department of Health issues these advisories. Detailed information can be found in Chapter 6.5.